adoption of Fritz Müller's law of recapitulation—that individual development (ontogeny) tends to be a condensed epitome of racial evolution (phylogeny); and although this generalisation requires very careful handling, and has often led to abuse in the writings of undisciplined popularisers, few would go the length of saying that its recognition has not enriched zoology. In his studies of Monera and the like Haeckel did not a little to show the fundamental biological importance of the Protozoa; his gastræa theory had a considerable and, on the whole, useful influence on embryology, though it has now been superseded; he was an explorer of the rarely visited field of pro-morphology (the study of shape and symmetry), in which the pioneers of bio-physics are now finding treasure. We might recall many of his suggestions which subsequent research has justified or may still justify: he was very early on the track of phagocytosis; he was sure that crystals have much to tell the biologist; he felt that heredity and memory were in some way related phenomena, and that the unconscious-psychical was not a contradiction in terms; he insisted that we have not heard the last of the application of the second law of thermodynamics to organisms; he was one of the early voices crying in the wilderness that biology was an integral part of education.

Anti-metaphysical by profession, Haeckel nevertheless expressed in his theory of cell-souls and the subjective aspect of the movements of matter a poetical hylozoism, akin to that of the early Ionic philosophers. He has been likened in this respect to a re-incarnation of Xenophanes. It was characteristic of his buoyant optimism that he never seems to have suspected how naïve his monistic philosophy was; but those who deplore the mischievousness for the ignorant of such a book as "The Riddle of the Universe" ought to take their share of the blame for not providing for the people equally readable antidotes or prophylactics. The rancour he displayed in these tragic years towards a country where he had many friends and in which he had been highly honoured must be viewed in the light of the fact that he was an octogenarian in enfeebled health when the war broke out, yet in his attitude and his utterances we see the continuation of that aggressiveness and bitterness which marked his attacks on conventional Christianity. It is in general terms a difficult riddle which his fellow-countryman Ostwald had the frankness to express in 1914: "Dieser unversöhnliche Gegner alles dogmatischen Christentums erwies sich als der beste und vorgeschrittendenste 'Christ' den Ich je persönlich kennen gelernt hatte." The explanation may be in part this, that Haeckel had several moods almost equally dominant. He was scientific, doubtless, and he himself declared that he was all for science, yet he had not that resoluteness of precision which Huxley referred to when he said that the assertion that outstrips the evidence is not only an error, but also a crime. He had the artistic and romantic temperament, he was a worshipper of beauty, he was to an extraordinary degree a passionate man of feeling. But he was also a preacher, a reformer, a propagandist—hence his surprising sympathy with Luther. He was so convinced in his own mind that he had got hold of the truth, and that those who differed from him were following errors and superstitions, that he was incapable of calmly considering criticism, still less of changing his views. His enthusiasm for science and his passion for Nature showed themselves in another expression in something like fanatic intolerance in his propagandist writings. Yet Haeckel did a day's work and a man's work in a fine, vigorous way, always himself and no other, and if he overdid the hunt for superstitions, who shall say that there was no excuse? Many people are not so good as their creeds, but everyone who knew Haeckel in his prime will agree that he was much better. *Vale.*

NOTES.

A CONFERENCE of representatives of the Meteorological Services of the British Dominions is to be held in London on September 23–27, when the subjects to be considered will include the meteorological arrangements for the exchange of observations by wireless at comparatively long distances; specification of observations for the surface and the upper air with the codes for transmission; the consideration of instruments and material for the investigation of the upper air; the selection of stations of the "Réseau Mondial" for the purpose of the general climatology of the globe (see "Réseau Mondial," 1911–12–13, M.O. Publications 207g, 209g, and 214g); the provision of current meteorological information for the main air routes of the world; co-operation in the investigation of the meteorological conditions of aerial navigation; and the trade routes and the meteorological survey of the oceans by observations transmitted by radio-telegraphy from ships. The following official meteorologists of the Dominions beyond the seas are expected to be present:—Capt. A. J. Bamford (Director of the Meteorological Service of Ceylon), the Rev. D. C. Bates (Director of the Meteorological Office of New Zealand), Mr. H. A. Hunt (Director of the Weather Bureau of the Commonwealth of Australia, Melbourne), Mr. H. Knox Shaw (Director of the Meteorological Service of the Public Works Ministry, Egypt), Mr. C. Stewart (Chief Meteorologist of the Union of South Africa), Sir Frederick Stupart (Director of the Meteorological Service of Canada), and Dr. G. T. Walker (Director-General of Indian Observatories).

IN connection with the autumn meeting of the Iron and Steel Institute, which is to be held at the Institution of Civil Engineers, Great George Street, Westminster, on September 18 and 19, there is to be, on the first-named date, a general conference on fuel economy, at which the following communications will be read:—Report on "Fuel Economy in Steel Works," Dr. W. A. Bone, Sir Robert Hadfield, Bart., and A. Hutchinson; Report on "Fuel Economy in Foundry Practice," H. J. Yates; and "Fuel Economy in German Iron and Steel Works," Cosmo Johns and L. Ennis. Papers down for reading and discussion on September 19 are:—"Synthetic Cast-Iron," C. A. Keller; "The Fluxing Action of Iron Oxides on Acid-Furnace Structures," J. H. Whiteley and A. F. Hallimond; "The Woody Structure of the Fractures of Transverse Test

Pieces from Special Steels," J. J. Cohade; "Nickel-chrome Forgings," J. H. Andrew, J. N. Greenwood, and G. W. Green; "Brittleness in Nickel-chrome and other Steels," F. Rogers; "Temper Brittleness of Nickel-chrome Steel," R. H. Greaves; "Experiments with Nickel Steels," N. Hudson; and "The Cause of Irreversibility in Nickel Steels," K. Honda and H. Takagi. Other papers expected are:—"Decarburisation of Steel," E. D. Campbell; "Nature of the A_1 Transformation and a Theory of Quenching," K. Honda; and "The Structure of Iron-Carbon-Chromium Alloys," T. Murakami.

PROF. G. E. HALE, director of the Mount Wilson Observatory, has been elected a foreign associate of the Paris Academy of Sciences.

THE appointment of Lord Lee of Fareham to the Presidency of the Board of Agriculture and Fisheries, in succession to Lord Ernle, resigned, has been approved by the King, as has also that of Sir Eric Geddes as Minister of Transport.

THE Bessemer medal of the Iron and Steel Institute for the present year has been awarded to Prof. F. Giolitti, of Turin.

THE Fream memorial prize for 1919 has been awarded by the Board of Agriculture and Fisheries to Miss Doris Anderson, a student of University College, Reading.

THE Elgar scholarship in naval architecture of the Institution of Naval Architects has been awarded to Mr. W. G. Green, and the Earl of Durham prize to Mr. W. G. Perring, both of Chatham Dockyard.

IT is announced that the widow of Prof. Milne has decided to return to her native country, Japan, and that in consequence the house at Shide, Newport, Isle of Wight, in which Prof. Milne did such important work in seismology is to be sold shortly by public auction.

THE death is announced of Prof. William Smith Greenfield, who held the joint chair of pathology and clinical medicine in the University of Edinburgh from 1881 to 1912. He was, in addition, physician to the Royal Infirmary, Edinburgh, and was probably the last occupant of such a dual professorship, which was not infrequent in a former generation before the present era of specialisation. Prof. Greenfield was a student of University College, London, and a graduate of the University of London, and previous to his appointment to the Edinburgh chair had been assistant physician and lecturer on pathological anatomy at St. Thomas's Hospital and professor-superintendent of the Brown Institution. His chief contributions to pathology were on anthrax and allied diseases, renal diseases, pyæmia, and diseases of the thyroid gland.

THE Government has decided to institute a competition for commercial types of aircraft with the view of obtaining a type giving greater safety. Prizes will be offered for three types of aircraft—a smaller aeroplane, a larger aeroplane, and a seaplane respectively. The terms of the competition will be announced shortly.

THE Home Office Committee on Miners' Lamps gives notice that it is open to consider new suggestions for improving the safety or illuminating power of safety lamps, and to examine and, if necessary, test any new devices or new types of lamps that may be sent by inventors. Communications on the matter should be addressed to Mr. E. Fudge, secretary of the Committee, Home Office, Whitehall, S.W.1.

THE United States Ordnance Department is appointing a number of experts in mathematics and dynamics to conduct scientific research on ordnance problems, to act as advisers on mathematical and scientific problems for the Department, and to maintain connection between the Department and the scientific world.

DR. PH. VOGEL, the well-known Indian archæologist, has published at Leyden an interesting paper entitled "The Sign of the Spread Hand, or Five-finger Token, in Pali Literature." He quotes numerous examples from the sacred books of Buddhism to show that this familiar symbol, a protection against the Evil Eye and the influence of malignant spirits, was commonly used in ancient India in connection with animal sacrifice and tree-worship. In one remarkable case the tree is a *Ficus indica*, and the spirit by which it is haunted is propitiated by means of a human sacrifice, the entrails being used as garlands and palm-marks made with the blood. This explains why women in the case of suttee up to recent times, when going to cremation with their lords, used to make marks on the gates of the palace with their hands steeped in vermilion. Numerous examples are given to prove that the use of this symbol as a protection is common in modern India and in other parts of the world.

IN the *Museum Journal* (vol. ix., Nos. 2-3) for September-December, 1918, Mr. C. W. Bishop discusses the horses of Tang T'ai-Tsung and the antecedents of the Chinese horse. In considering this series of reliefs in the University Museum, Philadelphia, a question arises about the origin of the representation of the flying gallop, showing the horse with legs extended skimming through the air as if shot from a bow. There was one culture area in which the representations of both animals and men in motion were executed with a vigour and a force unknown elsewhere—the Minoan or Ægean. All study points to the extreme unlikelihood of an independent invention of the same artistic convention in the Mediterranean and in China. The problem is by what means the idea was transmitted. The writer concludes that it spread in pre-Classical times to the regions north of the Black Sea, where it was eventually carried both to Sassanian Persia and to ancient China, apparently through the medium of the so-called Scythian culture, which overspread to much of Eastern Europe and Central Asia in early times, and in many ways acted as a sort of connecting link between East and West.

THE first number of a new periodical, the *Journal of Industrial Hygiene* (New York: The Macmillan Co.; London: Macmillan and Co., Ltd.), has reached us. It has grown out of the recent establishment, at Harvard University, of teaching and research in this field, and is published mainly under the auspices of this organisation, although it aims at being international in character. The scope of the journal may be gathered from the titles of the articles in the present issue. "Industrial Medicine and Surgery," "Lead Poisoning," "Fatigue," and "Telephone Operating in its Medical Aspects," together with full abstracts of current literature bearing on cognate subjects, are included. The printing and illustrations are well done. Although the formation of so many new journals for special departments of knowledge is in general to be regretted, there is no doubt that this one will be found of much value in bringing the results of scientific research to the acquaintance of the industrial world. The publication of results of original work, however, except such as is directed to very special economic ends, in journals of limited range is apt to lead to their becoming lost to the general body of scientific doctrine.

DURING the war the proper provision of life-belts and other life-saving appliances on ships became of vital importance owing to the submarine menace. One of the most widely used appliances was a life-jacket stuffed with "kapok" or floss. This floss has very great buoyancy, a jacket containing 24 oz. of the fibre being capable of supporting an adult in the water. According to the existing official regulations, the only kapok that may be used for this purpose is Java kapok, which consists of the long hair surrounding the seeds of a tree which occurs abundantly in the Dutch East Indies. A similar material is, however, obtainable from India, but from a different tree, and this Indian floss cannot under the existing regulations be used for life-jackets. The results of trials made at the Imperial Institute, details of which are given in the current issue of the Bulletin of the institute, have shown that the Indian floss can fully satisfy all the requirements as regards buoyancy and freedom from water-logging. It is, therefore, suggested that the use of Indian kapok should be officially permitted for life-jackets. Inquiries made by the Imperial Institute showed that kapok, equal in quality to that used in the trials, is available in India in large quantities.

THERE seemed a prospect but a little while ago of seeing a live okapi in London, for it was known that the Zoological Society had made a generous offer for a young animal which had for nearly three years been the pet of Mme. Landaghem, the wife of a Belgian medical officer stationed several hundred miles above Boma, on the Congo. This, however, was not to be, for Mme. Landaghem has patriotically presented her pet to her native country. It has just arrived in Antwerp, the first of its kind ever seen in Europe. The existence of this remarkable animal was first brought to light, it may be remembered, by Sir Harry Johnston, and through his good offices the first skin and skeleton to reach Europe were those of the female which arrived in London in 1901. Previous to this he had demonstrated the existence in the Belgian Congo of a large mammal new to science by sending to the Zoological Society of London a bandolier cut from the remarkably striped hindquarters of one of these elusive creatures—elusive because, though the natives had long talked mysteriously of some strange animal living in the innermost recesses of the forest, and had constantly promised to produce a specimen, that promise was overlong in its fulfilment. This bandolier Dr. P. L. Sclater—then secretary to the Zoological Society—concluded had been cut from some species of zebra hitherto unknown, and accordingly bestowed upon it the name *Equus johnstoni*. This seemed warranted by the evidence, but the sequel showed that it was to the giraffes, and not to the horses, that this bizarre-looking animal was related. As yet the sex of the new arrival has not been stated, but if it should prove to be a male the development of its horns will be watched with interest by all zoologists.

WE learn from the *Revue Scientifique* that the courses of higher instruction at the Institut d'Optique will be attended each year by selected military and naval officers in addition to university students and others associated with the optical industry. On the industrial side, the full course covering the working of glass and fine mechanics will extend over three years. Subsidies have been promised from the French Government to meet the annual expenditure, but an appeal is made for donations towards the initial expenses of the establishment of the institute. The list of members of the council of the institute includes a number of distinguished physicists.

DR. ARTHUR HOLMES (Quart. Journ. Geol. Soc., London, vol. xliv., p. 31, 1919), in a paper in which field-observation and delicate laboratory studies are happily combined, describes the pre-Cambrian and associated rocks of Mozambique. He utilises radioactivity as a means of correlating the ancient rocks with those of other areas; the ratio of lead to uranium present assigns the granulitic granites of Mozambique to the Middle pre-Cambrian, and the gneissose granite to a lower series, probably corresponding with the intrusive "Laurentian" rocks of Canada. The composite origin of the biotite-gneisses is shown, not only by the field-evidence of assimilation of schists by a granitic magma, but also by a radium-content intermediate between that of granites and schists. The lines of "inselberge" in the country are well discussed, and are connected with axes along which the uprising magmas have elongated themselves in the direction of the strike. Though we hesitate to use the phrase "the new geology," Dr. Holmes is an exponent of the most recent developments in an old science, which his papers help to keep very much alive.

MESSRS. POSNJAK and Merwin (*Amer. Journ. Sci.*, vol. xlvii., p. 311, 1919) provide a critical review of the natural hydrated ferric oxides, stress being laid on the curves that represent the phenomena of experimental dehydration. Turgite, which we should now write as turiite, is the only exception to the rule that decomposition takes place in the middle portion of the curve, accompanied by a colour-change from yellow to red. Turiite shows a gradual loss of water, and is, therefore, not regarded as a definite chemical compound, but as a solid solution of hæmatite and göthite with adsorbed water. The authors conclude from the close agreement of the molecular ratio of Fe_2O_3 and H_2O in specimens bearing different mineral names that there is no *series* of hydrates of ferric oxide in Nature, but that the only existing mineral ferric hydrate is "ferric oxide monohydrate," crystallising polymorphically as göthite and lepidocrocite. Limonite is an "amorphous" condition of the same substance. The fibrous structure that is so common in specimens styled "limonite" indicates some form of crystallisation, and the authors regard the fibrous examples, not as true limonite, but as göthite which has adsorbed capillary water. Both göthite and lepidocrocite are rhombic, the latter having a slightly lower density, and occurring in red, scaly crystals. The authors are able to add some new points to the mineralogical description of this species.

THE question of the degree of roundness of grains of various minerals occurring in sands is interestingly dealt with by Mr. J. J. Galloway ("Rounding of Sand Grains by Solution," *Amer. Journ. Sci.*, vol. xlvii., p. 270, 1919). The author urges that even quartz becomes appreciably rounded in natural waters by solution, and he illustrates experimentally how the smaller grains of a powdered mineral lose their forms and become spheroidal far more quickly than the larger ones. Rapid solution produces grain-surfaces as smooth as glass, while slow solution, of which quartz serves as an example, gives dull surfaces like those due to strong abrasion. Mr. Galloway does not assert that the cause of rounding can be determined in any given case. He shows, however, that we must consider solution as a factor.

PROF. P. G. H. BOSWELL summarises his recent work on sands, including the graphic representation of their texture, in a very convenient form by the publication of his inaugural lecture on "Sands: considered Geologically and Industrially, under War Conditions" (University Press of Liverpool, 1919, price 1*s*.).

UNDER the heading of "The Freedom of the Skies" the *Scientific American* for July 26 has an article by Prof. McAdie which deals with "some of the problems that will have to be solved as the human race takes to the air." Much that is said is reasoned from the analogy of the "freedom of the seas." The recent great war has fully shown the value of a command of the sea or air. The word "overcloud" is proposed for association and definition with "oversea" and "overland." It is suggested that what the Gulf Stream and the Japan Current are to the mariner the prevailing westerlies are to the aviator. The trades and monsoons are likened to rivers at the ground surface. It is stated that "the war just ended exemplified for the first time in history the right of a neutral nation to claim as territory the air above." The author deals with many features of interest, and the article contains much that is suggestive; one such point is that "if a steamship meets an adverse tide, her progress is delayed just so much, depending on the strength of the current; whereas when an airship encounters strong head winds, her pilot can rise or fall below the level of that particular air current and find a level in which the air will be moving with him and not against him." Many of the analogies dealt with show the great advantage of the combined association of mathematics and meteorology for a proper study of the upper air.

MONTHLY meteorological charts, which are issued by the Meteorological Office both for the North Atlantic and East Indian seas, are primarily intended for seamen. Now that aircraft are becoming of such importance, especially considering the rapid strides made in the last few months and the prospective voyage to India of R 33, these meteorological charts are assuming much greater interest. The Atlantic chart for the present month contains a large amount of valuable information. At present the North Atlantic is the ocean of primary importance for aircraft, but the winds are dealt with in a less satisfactory manner than for other oceans, "the frequency, the direction, and the average force of some characteristic winds are shown," whilst fuller details and *greater precision* are essential. A track is given showing the mean path of centres of cyclonic areas between America and Europe in August for the years 1883–91. A longer period, embracing the storms of recent years, would enhance the value of this information, appending, if practicable, details of individual instances. In August the south-east trade is seen to extend considerably to the northward of the equator, reaching on the eastern side so far north as latitude 13° N. The frequency of cloud with various winds at different times of day is given for Valencia and for St. Johns, Newfoundland, at the back of the chart. The August chart for the East Indian seas shows that the south-west monsoon is predominant over the sea to the north of the equator, whilst south of the equator to 25° S. the south-east trade blows almost uninterruptedly. North-westerly winds predominate over the whole length of the Red Sea. In August the average barometric pressure in the Red Sea is lower than in any month of the year, and the average air temperature is the highest of the twelve monthly values.

IN the Journal of the Royal Society of Arts for June 20 Mr. Watson Smith directs attention to a theory recently advanced by Tschirch to account for the spontaneous combustion of haystacks. It is based upon observations made in the drying of medicinal plants. A first phase of heating is regarded as due to oxidation processes caused by the plant oxydases at the expense of the air present in the stack. This results in a small rise of temperature, which ceases when the oxygen of the air in the stack is exhausted. In the next phase the chief *rôle* is played by reductases, which act energetically between 50° and 70° C., deoxidising and eventually carbonising such substances as amino-acids and carbohydrates. The danger of ignition lies in the accumulation of oxygen withdrawn by the reductases; the actual reduction processes would not themselves produce sufficient heat to ignite the material. To obviate the risk of spontaneous combustion two precautions are recommended:—(1) A thorough drying of the hay before stacking, which minimises enzyme action, and (2) thorough aeration of the stacks, which may be secured by building them in layers with air spaces between.

THE forty-third annual report of his Majesty's Inspectors of Explosives (1918) (Cd. 278, 1919) is of particular interest by reason of the inclusion of approximate figures for the production of explosives and ammunition of all classes in this country for the whole period from the outbreak of war to the signing of the armistice, together with statistics of the accidents which occurred. Of the three chief classes of military explosives the outputs and casualties were:—(1) Ballistites and cordites, 181,712 tons; persons killed, 35; injured, 50 (of the killed 27 lost their lives in one accident). (2) Picric acid, T.N.T., and other coal-tar products, 107,713 tons; killed, 177; injured, 368. (3) Other nitro-compounds, 62,048 tons; killed, 31; injured, 91. In all there were 1277 accidents reported, and in 544 no personal injury was caused. The maximum number of persons employed was 86,555; the average, 61,808. The total loss of life was 325, with 1316 injured, giving 1·25 killed per 1000 and 5 injured, compared with a fatality rate of 1 per 1000 for the five-year period ending 1910. The inspectors are more than justified in their comment that, "having regard to the output produced at high pressure, largely by workers with no previous experience, supervised in many cases by equally inexperienced officials, the general result may be regarded as satisfactory." It is a remarkable testimony to the supervision and protection of the workers that in filling more than 8,374,000,000 small-arm cartridges and 83,600,000 hand grenades in licensed factories during the war period there was not a single fatal accident and only 48 workers injured, with one exception all being engaged on cartridges. Nor was there any loss of life in the manufacture of blasting explosives (other than gunpowder) or in the conveyance of explosives during the year 1918. The report lays special stress on the dangers of compositions containing aluminium powder, for, although such mixtures are not unduly sensitive during test, accidents have been somewhat frequent, the reason of the primary ignition being obscure

WHEN a photographic negative is treated with a solution of a chromate well acidified with hydrochloric acid, the silver of the image is converted into silver chloride, and subsequent application of a developer reduces the silver chloride and leaves the metallic silver much as it was. But if the acid is deficient in quantity, reduction products of the chromate remain and reinforce the image. This method of intensification is well known. In the *British Journal of Photography* for August 8 Messrs. Lumière and Seyewetz state that they find that the acidified chromate may be replaced by a solution of potassium chlorochromate, thus using a definite substance instead of an indefinite or adjustable mixture. They find, too, that if the process is repeated on the same negative, the effect gradually diminishes, and after five or six treatments the intensification becomes negligible. They suggest that the chlorochromate acts thus:—

$$KClCrO_3 + 2Ag = KAgSO_3 + AgCl,$$

and that as only the silver chloride is reduced by the developer, the amount of silver available for the process is halved by each application of it. They have not, however, yet proved that the double sulphite is produced and that it resists the developer, and they are carrying their investigations further in this direction.

DURING the last few years the use of electric heating appliances has become common in the laboratory and workshop owing to the production of trustworthy heating elements. In most of these an alloy, capable of resisting oxidation at 1100° C., is wound round a tube or muffle, in the interior of which a temperature of 1000° C. can be attained. The small electric furnaces exhibited by Messrs. A. Gallenkamp and Co., Ltd., at the recent British Scientific Products Exhibition of the British Science Guild illustrated the numerous purposes for which such articles may be used with advantage, and were of satisfactory design. For heating small articles, or for estimating the amount of carbon in steel by combustion, the heating chamber consists of a silica tube 1–2 in. in diameter and 12–20 in. long, the power required to maintain a temperature of 1000° C. ranging from 400 to 800 watts. For laboratories in which many estimations of carbon in steel have to be made daily, two- or four-tube furnaces are constructed to facilitate rapid working. A special type, wound in sections capable of separate heating, is provided for organic combustions. For incinerations, the hardening of small steel articles such as taps, dies and gauges, etc., the muffle type of furnace is used, the dimensions of the largest made being 14×7×5 in., consuming 2300 watts. Messrs. Gallenkamp's furnaces are designed so that a new heating element can easily be inserted by the user, thus avoiding delay in the case of a winding burning out. Special attention is also paid to efficient lagging, and the casing and supports are strong and durable. Resistances for controlling the temperature are supplied with each furnace. A further commendable feature is that a purchaser may procure a furnace to suit his own work, and is not compelled to take one of the ordinary stock patterns.

THE following new books of science are announced:—By *Messrs. George Allen and Unwin, Ltd.*—"Mineral Resources of Georgia and Caucasia," D. Ghambashidze; "The Equipment of the Workers," "The Education of the Workers," and "The Environment of the Workers." By *Mr. Edward Arnold*—"Ions, Electrons, and Ionising Rays," Dr. J. A. Crowther; "Surveying," W. N. Thomas; "Tacheometer Tables," Prof. H. Louis and G. W. Gaunt; "The Principles of Electrical Engineering and their Application," Prof. Gisbert Kapp, vol. ii.; "Examples in Electrical Engineering," J. S. Gill and F. J. Teago; and "Algebra for Engineering Students," S. Eastwood and J. R. Fielden. By *Messrs. W. Heffer and Sons, Ltd. (Cambridge)*—"Groundwork of Surgery for First-year Students," A. Cooke. By *Messrs. Crosby Lockwood and Son*—"Electric Spark Ignition in Internal Combustion Engines," J. D. Morgan; and new editions of the "Mechanical Engineer's Pocket-Book," the late D. Kinnear Clark, revised and enlarged by H. H. P. Powles; and "Hand Sketching for Mining Students," G. A. Lodge and N. Harwood. By *Messrs. Methuen and Co., Ltd.*—"Coal Mining and the Coal Miner," H. F. Bulman. By *Messrs. Seeley, Service, and Co., Ltd.*—"Chemistry and its Mysteries: The Story of what Things are made of, Told in Simple Language," C. R. Gibson, and "The Marvels of Photography: Describing its Discovery and Many of its Achievements," C. R. Gibson. By *Messrs. Witherby and Co.*—"A Geographical Bibliography of British Ornithology," H. Kirke Swann, W. H. Mullens, and F. C. R. Jourdain; "A Handbook to the Vertebrate Fauna of North Wales," H. E. Forrest; "Meteorology for All," D. W. Horner; "The Birds of France," C. Ingram; and "Monograph of the Pheasants," W. Beebe, vol. ii.

OUR ASTRONOMICAL COLUMN.

KOPFF'S COMET 1906 IV. = 1919*a*.—M. Ebell has published (*Ast. Nach.*, 4996) an ephemeris of this comet from Dr. Zappa's elements (*A.N.*, Bd. 194) with a correction of +23·48′ to the mean anomaly. The observations made during the month show a correction to this of about −7′ in declination. The following positions (for Greenwich midnight) include this correction:—

	R.A. h. m. s.	S. Decl. ° ′	Log r	Log Δ
Aug. 21 ...	19 29 22	8 16·4		
23 ...	19 30 16	8 13·6	0·250	9·942
25 ...	19 31 19	8 11·2		
27 ...	19 32 28	8 9·1		
29 ...	19 33 45	8 7·3		
31 ..	19 35 8	8 5·8	0·256	9·973

The computed brightness decreases from magnitude 10·9 to 11·1 during this period. The comet passed through perihelion on June 28 last.

OCCULTATION OF SMALL STARS BY JUPITER.—Mr. Arthur Burnet sends particulars of two phenomena of this kind that he predicts will happen in the coming months. The star B.D. +18° 2062, mag. 8·9, R.A. 8h. 46m. 52s., dec. 18° 23′ 22″ N., will be occulted on September 15 between 14h. 15m. and 15h. 1m. G.M.T. As Jupiter will rise at Greenwich at 13h. 30m. on that night, the possibility of successful observation from this part of the world is doubtful. On October 5 the star B.D. +17° 2007, mag. 7·8, will be occulted before 11 o'clock G.M.T., when it will not rise at Greenwich until after midnight. The occultation may be visible in India from 10h. 25m. to 11h. 36m. Apparent place of the star on October 5, R.A. 9h. 1m. 46s., dec. 17° 26′ 2″ N.

A MAGNETIC STORM.—The traces on the sheets of the magnetographs at Greenwich showed violent disturbance on Monday, August 11, beginning about 7 o'clock in the morning and lasting for twenty-four hours. From notes in the daily Press it appears that telegraph lines and cables were affected, and that operators experienced much difficulty due to earth currents. There was a spot on the sun at the time, not of the largest size, but about 500 millionths of the visible surface in area, which had passed the central meridian on August 8. There was also a broken group of small spots following this, and another regular spot rather less in area than the first was approaching the central meridian.

THE RECENT SOLAR ECLIPSE.—Though the observers of the British expedition to the Island of Principe were not favoured with specially fine weather, some useful results were obtained. Ten of the plates exposed were spoiled by cloud so far as the object of the expedition was concerned, but give an excellent representation of the large prominence which was on the sun's limb at the time. The remaining six photographs show κ^1 and κ^2 Tauri and two or three other stars. The measurement of these should show the looked-for deflection if it exists.